

The right tool for the job: is it iPS, ES or adult? Answer: It depends

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Two stem cell stories in the news today bring to mind yesterday's interview on NPR's Fresh Air, in which veteran journalist Matthew Wald of the New York Times said of the decision to store spent nuclear waste in Yucca Mountain, NV:

“ Yucca was chosen by the finest geologists in the United States Senate, which is to say they may not have made the best technical choice.

A similar statement could be made about stem cell research policies, which are to some degree being made by the best stem cell scientists in politics.

People who oppose embryonic stem cell research point to reprogrammed iPS cells and adult (or more accurately tissue-specific) stem cells as perfect replacements. These arguments are winning some political advocates around the world including France where they are debating a ban on human embryonic stem cell research and in Ireland (which we've blogged about recently), but aren't borne out by science.

Just to be clear, we here at CIRM are big fans of reprogrammed and tissue-specific stem cells, which is why we fund so much of that work (you can see all of our adult stem cell grants here and our reprogrammed iPS cell grants here). But we're also big fans of the right tool for the right job, and just because we love our hammer and screwdriver doesn't mean we don't still need a few wrenches to get the job done.

Today's news brings a story from *Nature* about a paper published in *Cell Stem Cell* in which scientists in France used embryonic stem cells to learn how a mutation leads to the muscle wasting disease myotonic dystrophy. The discovery could help scientists understand and treat the disease. They quote Marc Peschanski, director of the Institute for Stem Cell Therapy and an author of the latest paper.

“ Peschanski runs a large iPS-cell research programme in addition to his hES-cell work. "We make iPS cells to model particular diseases when we don't have access to the relevant hES cells - which remain our gold standard," he says.

Politicians who oppose hES-cell research often - wrongly - insist that iPS cells can always substitute for hES cells, says Peschanski. He is frustrated that the lower house of the French parliament invoked this argument when proposing a ban on hES-cell research in France. Peschanski has since been working with other French scientists to persuade the Senate to overturn the proposal next week.

A related story from *Reuters* cites several recent papers showing significant differences between iPS and embryonic stem cells. They write:

“ Stem cell scientists are not giving up on iPS cells, but instead of a replacement for embryonic stem cells, they see them filling a unique research role.

We've written quite a bit about the role of iPS cells (The confusing (and ongoing) story of iPS vs. embryonic stem cells) and their clear value in generating disease in a dish models for understanding diseases and testing drugs. The Reuters story goes on to quote George Daley of the Harvard Stem Cell Institute and Harvard Medical School:

“ It has not ever been a scientifically driven argument that iPS cells are a worthy and complete substitute for embryonic stem cells," Daley said. "Those arguments were always made based on political and religious opposition to embryonic stem cells."

CIRM grantee Jeanne Loring of The Scripps Research Institute in La Jolla has said that what's not known is what these differences between the cell types mean (here's our blog entry on that work). Are they deal breakers in terms of using the cells therapeutically, or are they just temporary set backs while scientists work to develop better iPS cells? For now that's not known.

Which is all to say that in order to get the job done of understanding and treating diseases, scientists need all the tools at their disposal. Sometimes tissue-specific stem cells are going to be ideal. Blood-forming stem cells in bone marrow have certainly proven their worth in treating a number of blood diseases. And iPS cells are becoming valuable tools for studying diseases in a dish. But I wouldn't want to build a house with just a hammer, and I'd hate to see stem cell scientists trying to generate new cures without a full toolbox of cells to work with.

- A.A.

Tags:

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